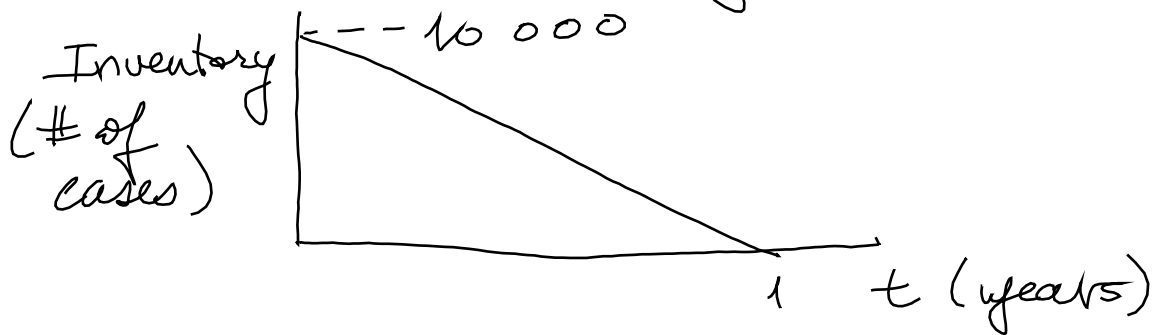


GOLDSTEIN § 2.6 # 5:

10 000 cases of tennis balls
yearly sales at a
steady rate



Let $r = \#$ of orders per year

$x = \#$ of cases per order

Inventory cost = Carrying Costs + ordering costs

$$\min IC(r, x) = 10 \cdot \frac{x}{2} + 80 \cdot r$$

subject to

① $r \cdot x = 10\,000$ CONSTRAINT

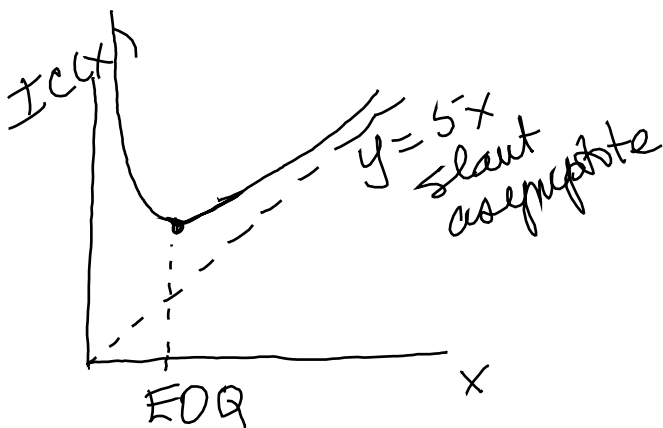
② $r \geq 0$

③ $x \geq 0$

$$IC(r, x) = 10 \cdot \frac{x}{2} + 80r$$

$$r = \frac{10\,000}{x}$$

$$IC(x) = 5x + \frac{800\,000}{x}, \quad x > 0$$



$$IC'(x) = 5 - \frac{800\,000}{x^2} = 0, \quad x > 0$$

$$x^2 = \frac{800\,000}{5} = 160\,000$$

$$x = \pm 400 \Rightarrow \boxed{x = 400}$$

$$IC''(400) = \frac{1\,600\,000}{400^3} > 0 \quad \cup \quad \text{absolute.}$$

We should order 400 cases per order.